N00129.AR.001255
NSB NEW LONDON
5090.3a

MONTHLY OPERATIONS SUMMARY FOR THE NAVAL EXCHANGE (NEX) AND DOLPHIN MART AIR SPARGING/SOIL VAPOR EXTRACTION SYSTEMS AND OT-8 PASSIVE FREE PRODUCT RECOVERY SYSTEM

NEW LONDON SUBMARINE BASE
GROTON, CONNECTICUT

Month: November 1997

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grsubbas\wp\gr2.49

OPERATIONAL SUMMARY

DOLPHIN MART AIR SPARGE/SVE SYSTEM

System Status - The remediation system at the site has been operating since June 29, 1996. As of November 21, 1997, thirteen (13) horizontal vapor extraction trenches (VET-1, VET-2, VET-3, VET-4, VET-5, VET-6, VET-7, VET-8, VET-9, VET-10, VET-11, VET-12, and VET-17) and seven (7) air sparge points (ASP-A, ASP-B, ASP-C, ASP-D, ASP-E, ASP-F, and ASP-G were operating. VET-13 through VET-16 and air sparge points ASP-H through ASP-Q are currently not operating due to high groundwater conditions and low dissolved VOC concentrations in their vicinity. The SVE system is currently extracting subsurface air at a flow rate of approximately 590 scfm. The air sparge system is currently injecting air at a flow rate of approximately 32 scfm. A site map has been included as **Figure 1**. The site visit forms for O&M conducted during the month of November, 1997 are included in **Attachment 1**. A weekly break-down of the month's field activities has been included as **Attachment 2**.

Mass Removal - The total hydrocarbon mass removal rate, based on the SVE system influent sample collected November 20, 1997, was 0.45 lbs/hour. During the period from October 23, 1997 to November 20, 1997 approximately 118 lbs of hydrocarbons were extracted by the remediation system. The total hydrocarbon mass extracted by the remediation system, as of November 20, 1997, was approximately 1,787 lbs. The system database has been included in **Attachment 3**. Mass removal graphs have been included as **Figures 3A, 3B and 4**. Based on the hydrocarbon mass removal rate, no exceedance of CTDEP air quality guidelines was observed.

Carbon Usage - A summary of the historical vapor phase carbon usage at the site has been included as **Attachment 4**. The last carbon change at the site occurred August 27, 1996.

Discharge Monitoring Sampling -Discharge monitoring sampling was completed November 20, 1997.

Monitoring Well Gauging - The site monitoring wells were last gauged November 21,1997 during the quarterly groundwater sampling event. Depth to groundwater at the site ranged from 0.95 feet in OBG-9A to 8.86 feet in WE-3. The next well gauging event is currently scheduled during the February 1998 quarterly groundwater sampling event. Historical well gauging data has been included in **Attachment 5**.

Monitoring Well Sampling - Monitoring well sampling was last completed on November 21, 1997. The Quarterly Groundwater Sampling Report for the November sampling event is currently being prepared. The next quarterly sampling event is scheduled for February, 1998. The historical groundwater sampling results have been summarized in **Attachment 6**.

Additional Activities - None

NEX AIR SPARGE/SVE SYSTEM

System Status - The remediation system at the site has been operating since July 31, 1996. As of November 20, 1997, eight (8) vapor extraction wells (VEB-8 through VEB-15) were operating. The remainder of the vapor extraction points are deactivated pending system modification. The air sparge system was activated April 17, 1997. As of November 20, 1997, eleven (11) air sparge points (SPB-15 through SPB-25) were operating. The SVE system is currently extracting subsurface air at an average flow rate of approximately 213 scfm (from the east system only). The air sparge system is currently injecting air at a flow rate of approximately 47 scfm. A site map has been included as **Figure 2**. The site visit forms for O&M conducted during the month of November, 1997 are included in **Attachment 1**. A weekly break-down of the monthly field activities has been included in **Attachment 2**.

Mass Removal - The total hydrocarbon mass removal rate, based on the SVE system influent sample collected November 20, 1997, was 0.07 lbs/hour. During the period from October 23, 1997 to November 20, 1997 an estimated 14 lbs of hydrocarbons were extracted by the remediation system. An increase in the influent concentrations since August, 1997 may have been caused by a suspected release at the NEX Service Station. Along with the increased hydrocarbon concentrations, MTBE was detected in influent concentrations for the first time in September and the MTBE concentration further increased in October. MTBE was detected at a concentration of 1.12 ppmv in the November influent sample. The total hydrocarbon mass extracted by the remediation system, as of November 20, 1997, is approximately 1,480 lbs. The system database has been included in **Attachment 3**. Mass removal graphs have been included as **Figures 5A, 5B and 6**. Based on the hydrocarbon mass removal rate, no exceedance of CTDEP air quality guidelines was observed.

Carbon Usage - Due to increased influent VOC concentrations, the A/B and C/D carbon units at the NEX site were returned to service on October 23, 1997. A summary of the historical vapor phase carbon usage at the site has been included as **Attachment 4**. The last carbon change occurred 8/8/96.

Discharge Monitoring Sampling -No discharge occurred at the NEX site during the month of November 1997.

Monitoring Well Gauging - The last complete round of well gauging occurred on November 20, 1997 during the quarterly groundwater sampling event. Depth to groundwater at the site ranged from 4.35 feet in ERM-5 to 8.77 feet in ERM-16. No measurable thickness of light non-aqueous phase liquid (LNAPL) was detected in any of the monitoring wells, however, petroleum absorbent socks have been placed in monitoring wells historically containing LNAPL including: ERM -12, ERM-14, ERM-16, and OBG-9. Historical well gauging data has been included in **Attachment 5**. The next complete round of well gauging is scheduled during the February 1998 quarterly groundwater sampling event.

Monitoring Well Sampling - Monitoring well sampling was completed on November 20, 1997. The Quarterly Groundwater Sampling Report for the November sampling event is currently being prepared. The next quarterly sampling event is scheduled for February, 1998. The historical groundwater sampling results have been summarized in **Attachment 6**.

Additional Activities - None

OT-8 PASSIVE FREE PRODUCT RECOVERY SYSTEM

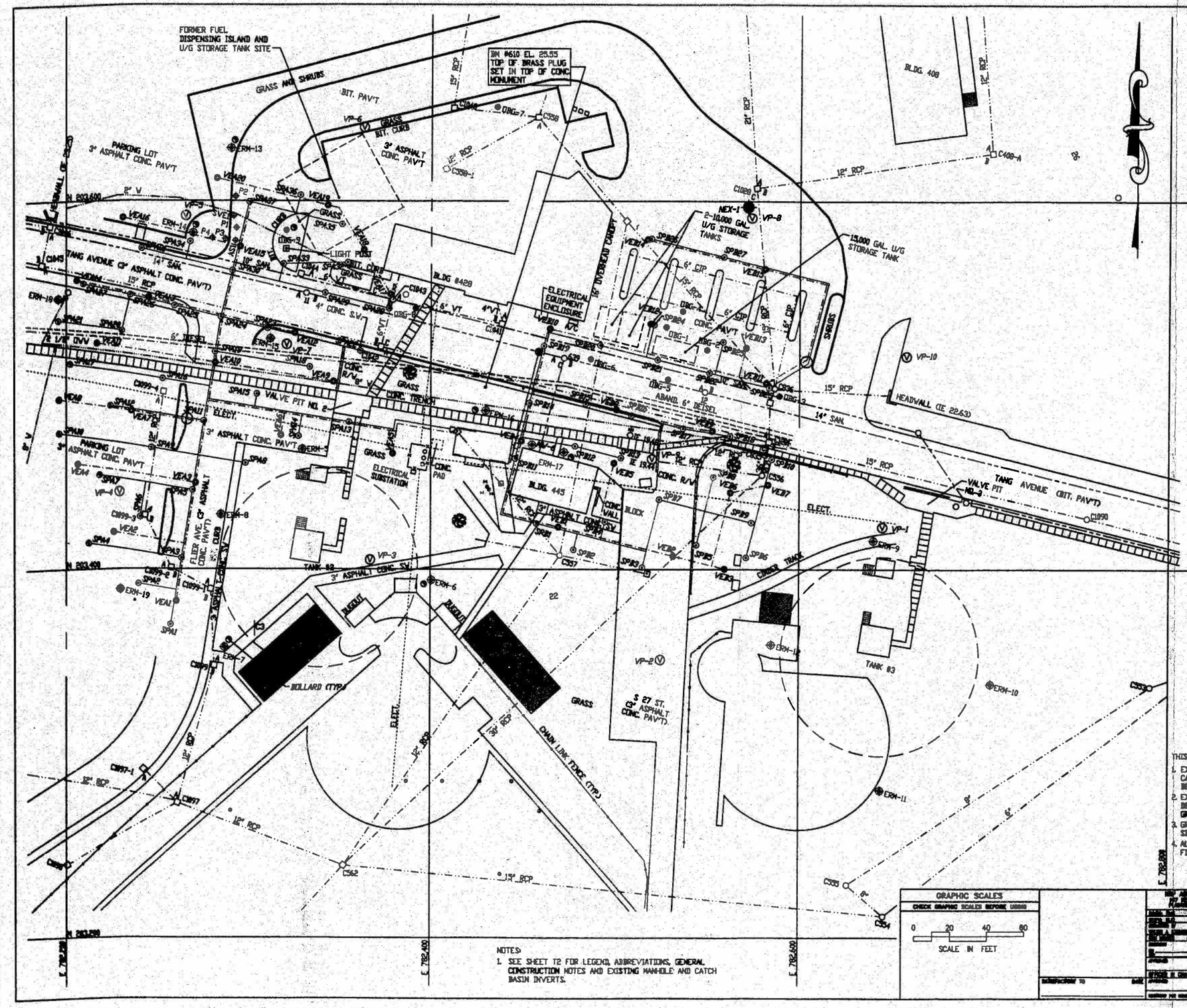
System Status - The OT-8 passive free product recovery system was activated on September 28, 1996. The system was active during the month of November 1997.

Product Recovery - As of November 20, 1997 a total of approximately 4.25 gallons of LNAPL have been recovered by the system. The fluctuating groundwater table around MW-7 may lead to smearing of the LNAPL. A copy of the well construction log for MW-7 has been included as **Attachment 7**. *Please note: The screen interval of MW-7 begins at five feet below grade.*

Monitoring Well Gauging - MW-7 was gauged on November 20, 1997. On November 20, 1997 the depth to LNAPL was 4.73 feet below grade and the depth to groundwater was 4.74 below grade. Historical gauging data for MW-7 is included in **Attachment 5**.

Additional Activities - During site visits, product accumulating in MW-7 was hand bailed and placed in a drum located in the OT-8 drum storage area.

FIGURES



REVISIONS				
LTR	DESCRIPTION	PREP'D BY	DATE	APPROVED

HIGHEST RECORDED GROUND WATER ELEVATION

WELL NO.	GROUND WATER EL.	WELL NO.	GROUND WATER EL.
DBG-1	16.73	ERM-18	16.97
DBG-2	17.09	ERM-19	16.06
DBG-4	16.63	ERM-1	17.09
DBG-5	16.85	ERM-2	16.31
DBG-6	16.76	ERM-3	14.76
DBG-7	18.40	ERM-4	16.86
DBG-8	17.96	ERM-5	17.78
DBG-9	17.63	ERM-6	16.79
ERM-10	18.68	ERM-7	15.81
ERM-11	17.84	ERM-8	17.14
ERM-12	16.69	ERM-9	17.00
ERM-13	17.50		
ERM-14	17.46		
ERM-15	17.59		
ERM-16	17.71		
ERM-17	16.91		

NOTE:
GROUND WATER DATA SHOWN ON PLANS ARE APPROXIMATELY AS SHOWN FOR BIDDING PURPOSES. ACTUAL WELL ELEVATIONS TO BE DETERMINED IN FIELD BY CONTRACTOR.

THIS MAP WAS PREPARED FROM MAPS LISTED BELOW

1. EXISTING TOPOGRAPHY FROM MAP BY JAMES S. HINGES & ASSOCIATES, CARLSON & SVEATT FARMINGTON, CT & NEW YORK, N.Y. DATED 31 DEC. 1974.
2. EXISTING UTILITIES FROM 40 SCALE UTILITY MAPS SUPPLIED BY THE DEPARTMENT OF PUBLIC WORKS, NAVAL SUBMARINE BASE, NEW LONDON, GROTON, CT.
3. GROUND WATER ANALYTICAL RESULTS, JANUARY, 1992 NEX STATION SITE US SUBBASE, GROTON, CT PREPARED FOR ERM-PNC.
4. ALL TOPOGRAPHIC FEATURES AND INVERTS SHOWN HEREON SHALL BE FIELD VERIFIED.

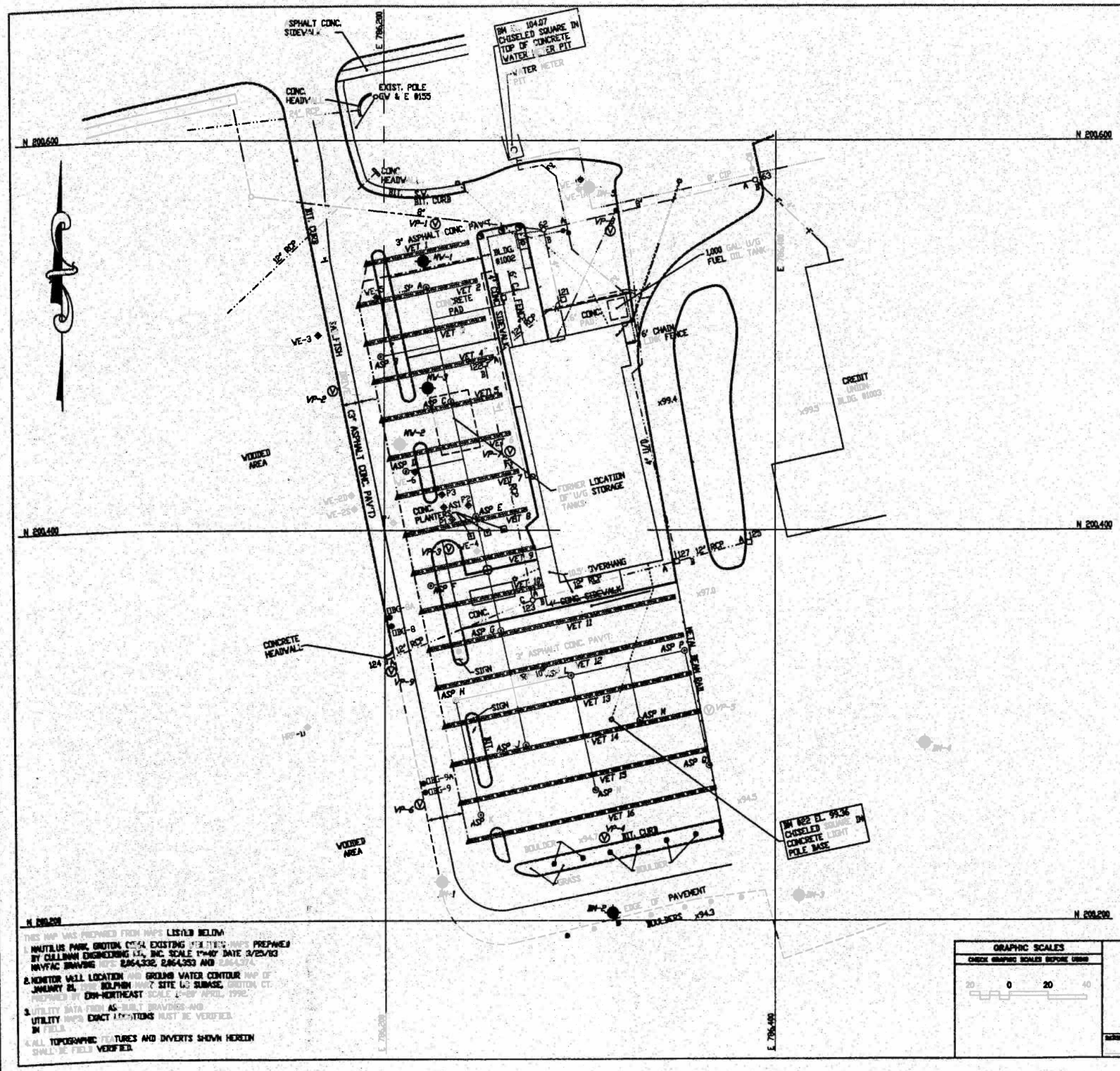
NOTES:
1. SEE SHEET T2 FOR LEGEND, ABBREVIATIONS, GENERAL CONSTRUCTION NOTES AND EXISTING MANHOLE AND CATCH BASIN INVERTS.

GRAPHIC SCALES
CHECK GRAPHIC SCALES BEFORE USING
0 20 40 60
SCALE IN FEET

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
NORTHERN DIVISION — PHILADELPHIA, PENNSYLVANIA
NAVAL SUBMARINE BASE — NEW LONDON, CONNECTICUT
REMEDIATION OF CONTAMINATED SOIL/GROUND WATER
FIGURE 2 - SITE PLAN
NAVAL EXCHANGE (NEX)

SIZE	CODE IDENT. NO.	DRAWING NUMBER	REV. NO.
F	80091	2166439	C1-1

CONTR. CONTR. NO. N62472-88-C-0060
SPEC. NO. 04-92-0060 SHEET 4 OF 34



REVISIONS				
LTR	DESCRIPTION	PREP'D BY	DATE	APPROVED

HIGHEST RECORDED GROUNDWATER ELEVATIONS

WELL NO.	GROUNDWATER ELEVATION
WE-1A	96.84
WE-2S	94.25
WE-2D	94.31
WE-3	93.93
WE-4	94.11
WE-5	95.40
WE-6	95.41
OBG-8A	93.70
OBG-9A	94.80
HRP-10	93.5 (ESTIMATED)
HRP-11	92.5 (ESTIMATED)

NOTE:
GROUND WATER DATA SHOWN ON PLANS ARE APPROXIMATELY AS SHOWN FOR BIDDING PURPOSES. ACTUAL WELL ELEVATIONS TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR.

SOIL VAPOR EXTRACTION TRENCH PIPE ELEVATIONS - DOLPHIN MART

TRENCH NO.	INV. ELEV. 6" VAPOR COLLECTION PIPE	INV. ELEV. 2" PIPE @ WEST END OF TRENCH	INV. ELEV. 2" PIPE @ EAST END OF TRENCH
VET 1	94.64	99.41	99.46
VET 2	94.64	98.80	98.85
VET 3	94.48	98.19	98.24
VET 4	94.32	97.50	97.62
VET 5	94.16	96.78	97.30
VET 6	94.00	96.20	97.20
VET 7	93.84	95.65	97.00
VET 8	93.68	95.13	96.80
VET 9	93.52	94.62	96.60
VET 10	93.36	93.52	96.40
VET 11	93.20	93.37	95.80
VET 12	93.04	93.23	95.22
VET 13	92.88	93.09	94.64
VET 14	92.72	92.95	94.04
VET 15	92.56	92.80	93.56
VET 16	92.40	92.66	93.08

NOTES:
1. SEE SHEET T2 FOR LEGEND, ABBREVIATIONS GENERAL CONSTRUCTION NOTES AND EXISTING MANHOLE AND CATCH BASIN INVERTS.

THIS MAP WAS PREPARED FROM MAPS LISTED BELOW:
1. NAUTILUS PARK, GROTON, CT. EXISTING FACILITIES MAPS PREPARED BY CULLINAN ENGINEERING CO., INC. SCALE 1"=40' DATE 3/25/93 NAVFAC DRAWING MAPS 2,864,332, 2,864,353 AND 2,864,374.
2. MONITOR WELL LOCATION AND GROUND WATER CONTOUR MAP OF JANUARY 21, 1992. DOLPHIN MART SITE U.S. SUBASE, GROTON, CT. PREPARED BY ERM-NORTHEAST SCALE 1"=20' APRIL, 1992.
3. UTILITY DATA FROM AS-BUILT DRAWINGS AND UTILITY MAPS. EXACT LOCATIONS MUST BE VERIFIED IN FIELD.
4. ALL TOPOGRAPHIC FEATURES AND INVERTS SHOWN HEREIN SHALL BE FIELD VERIFIED.

GRAPHIC SCALES
CHECK GRAPHIC SCALES BEFORE USING
20 0 20 40

Satisfactory to DATE

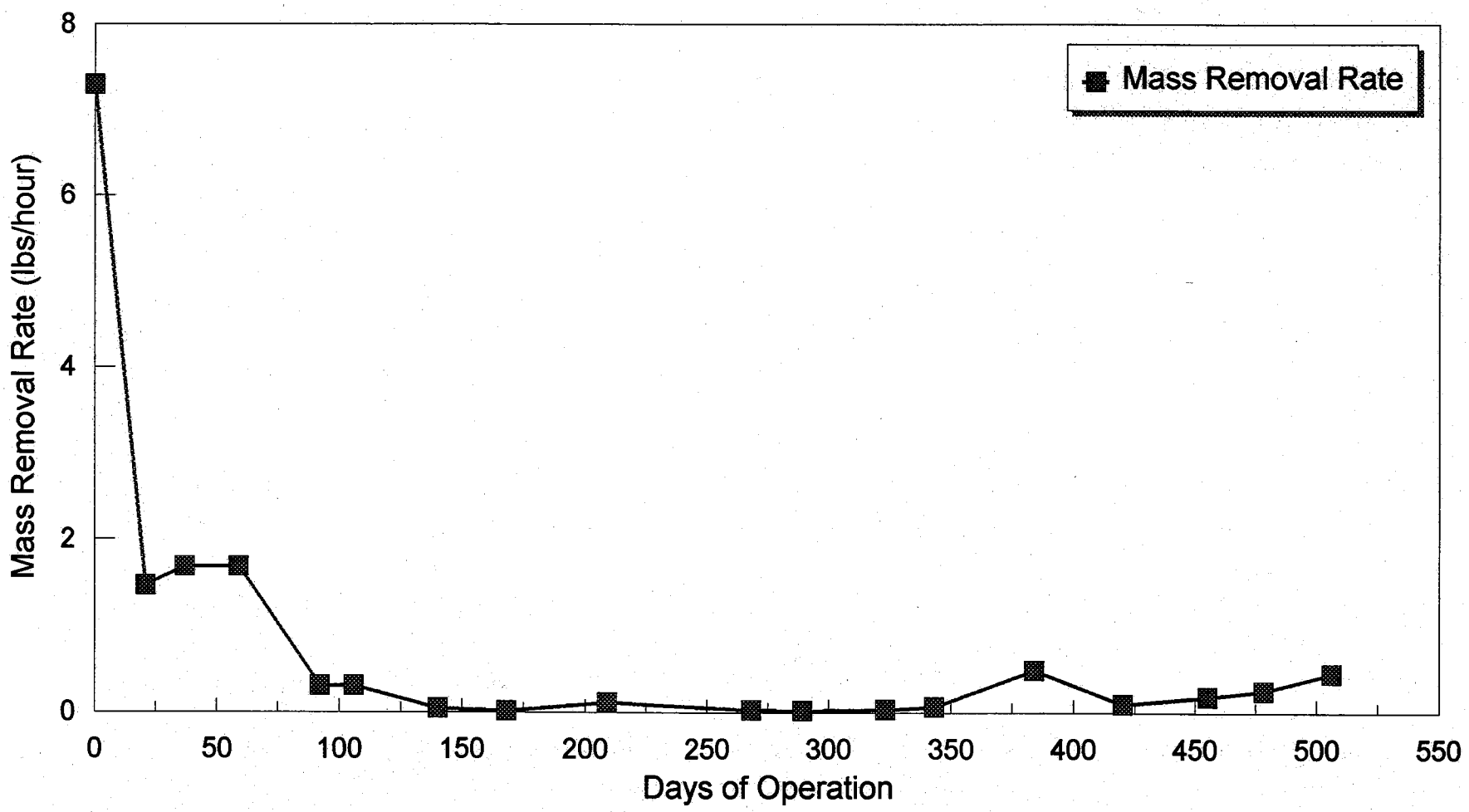
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
NORTHERN DIVISION
NAVAL SUBMARINE BASE NEW LONDON CONNECTICUT
REMEDIATION OF CONTAMINATED SOIL/GROUND WATER
FIGURE 1 - SITE PLAN
DOLPHIN MART

DSN	CONT. DRWG. NO.	CONTRACT DRAWING NO.	SHEET NO.
F	80091	2166440	C2-1

CONTR. DRWG. NO. N62470-90-C-0000
SPEC. NO. 94-90-0000 SHEET 8 OF 34

Figure 3A- Mass Removal Rate

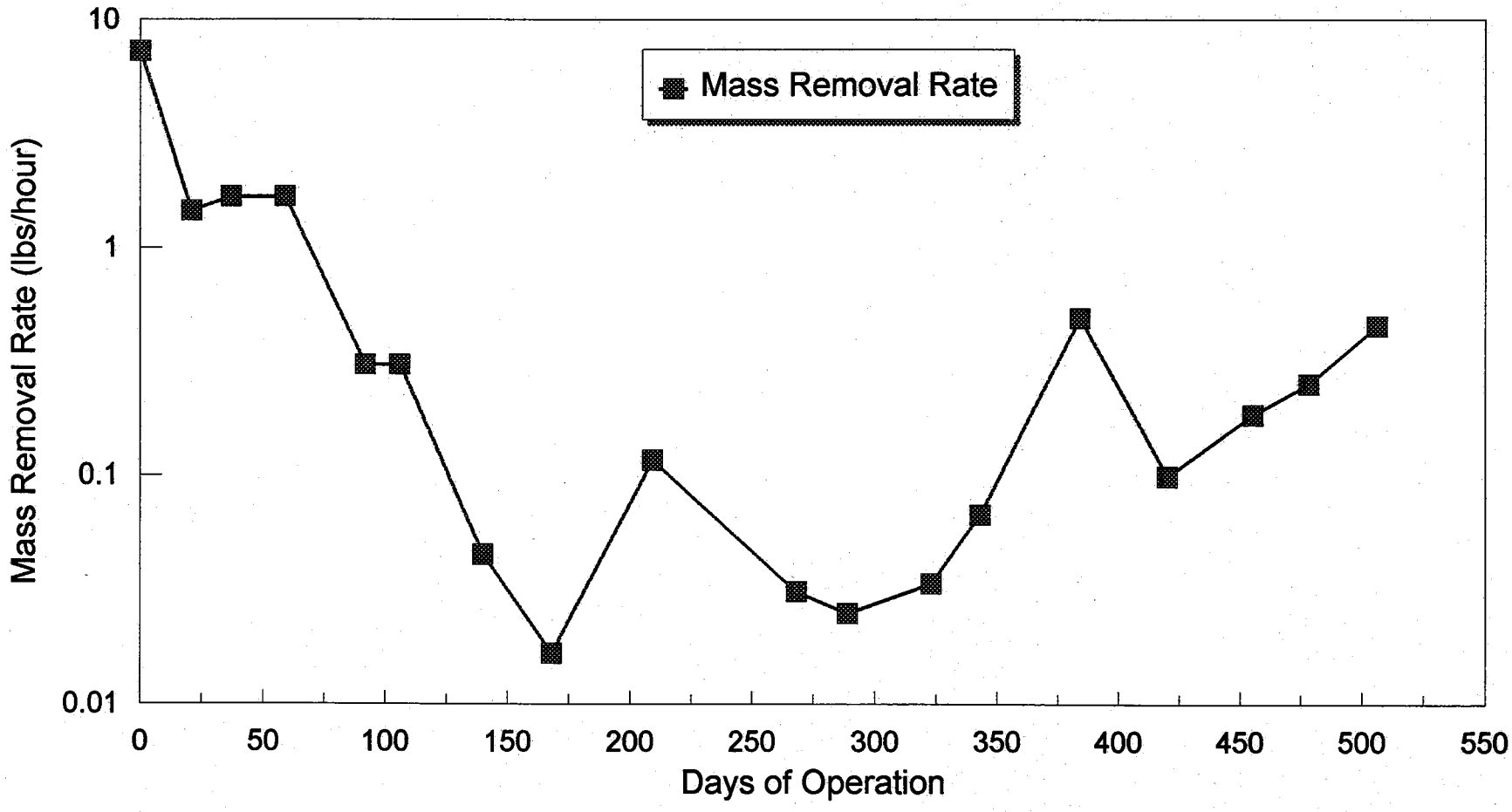
Dolphin Mart Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 3B- Mass Removal Rate

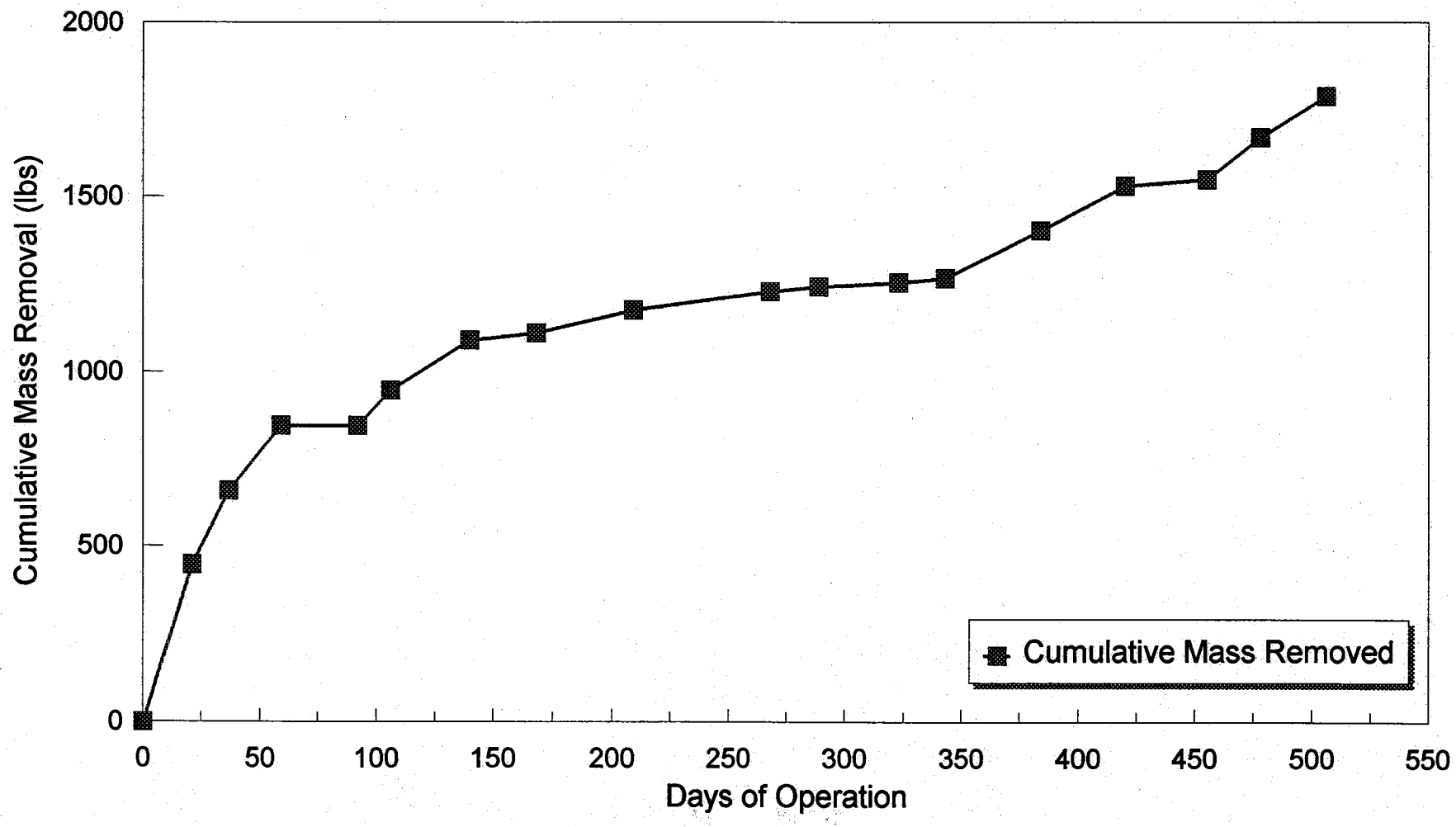
Dolphin Mart Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 4 - Cumulative Mass Removed versus Time

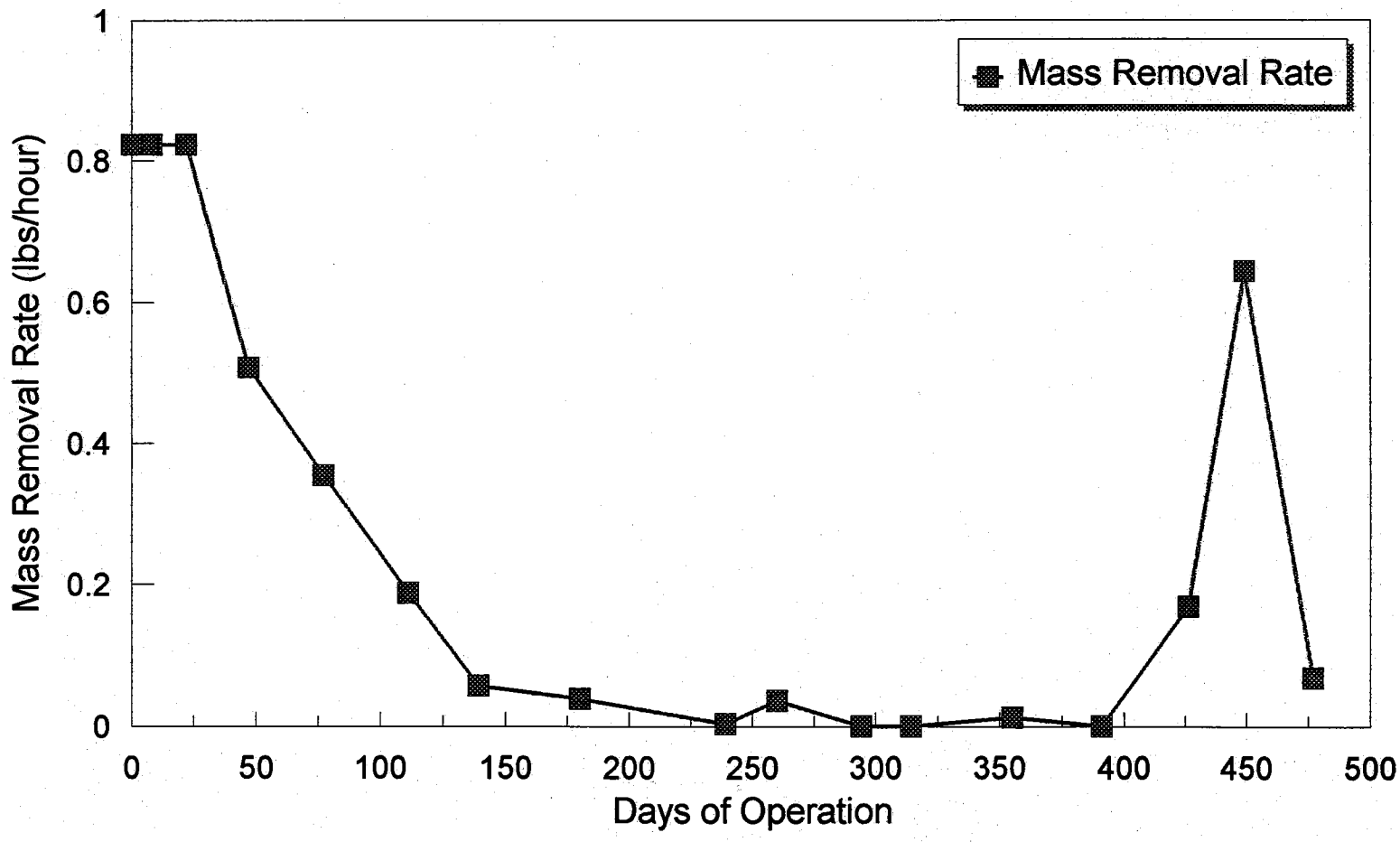
Dolphin Mart Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 5A - Mass Removal Rate

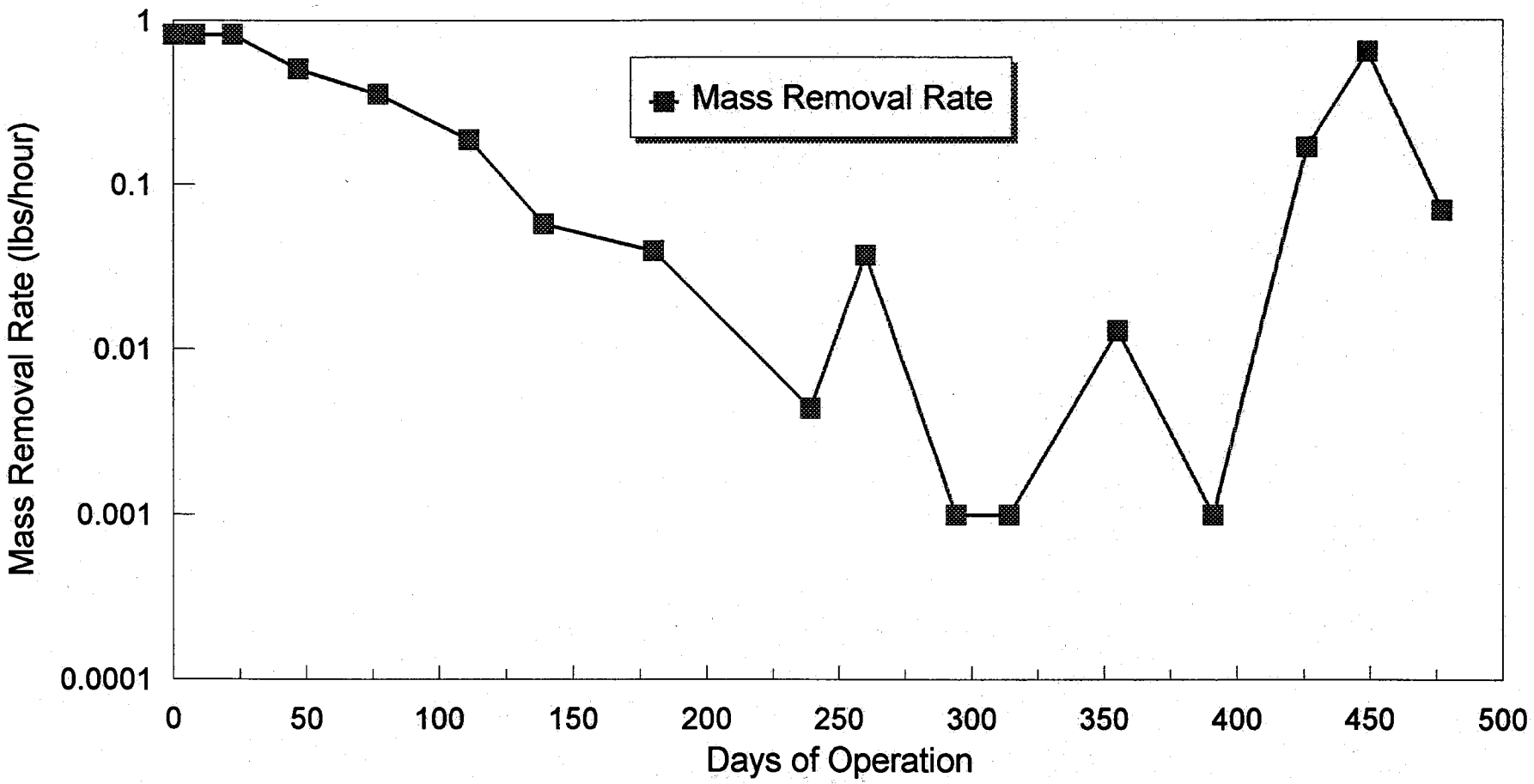
NEX Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 5B - Mass Removal Rate

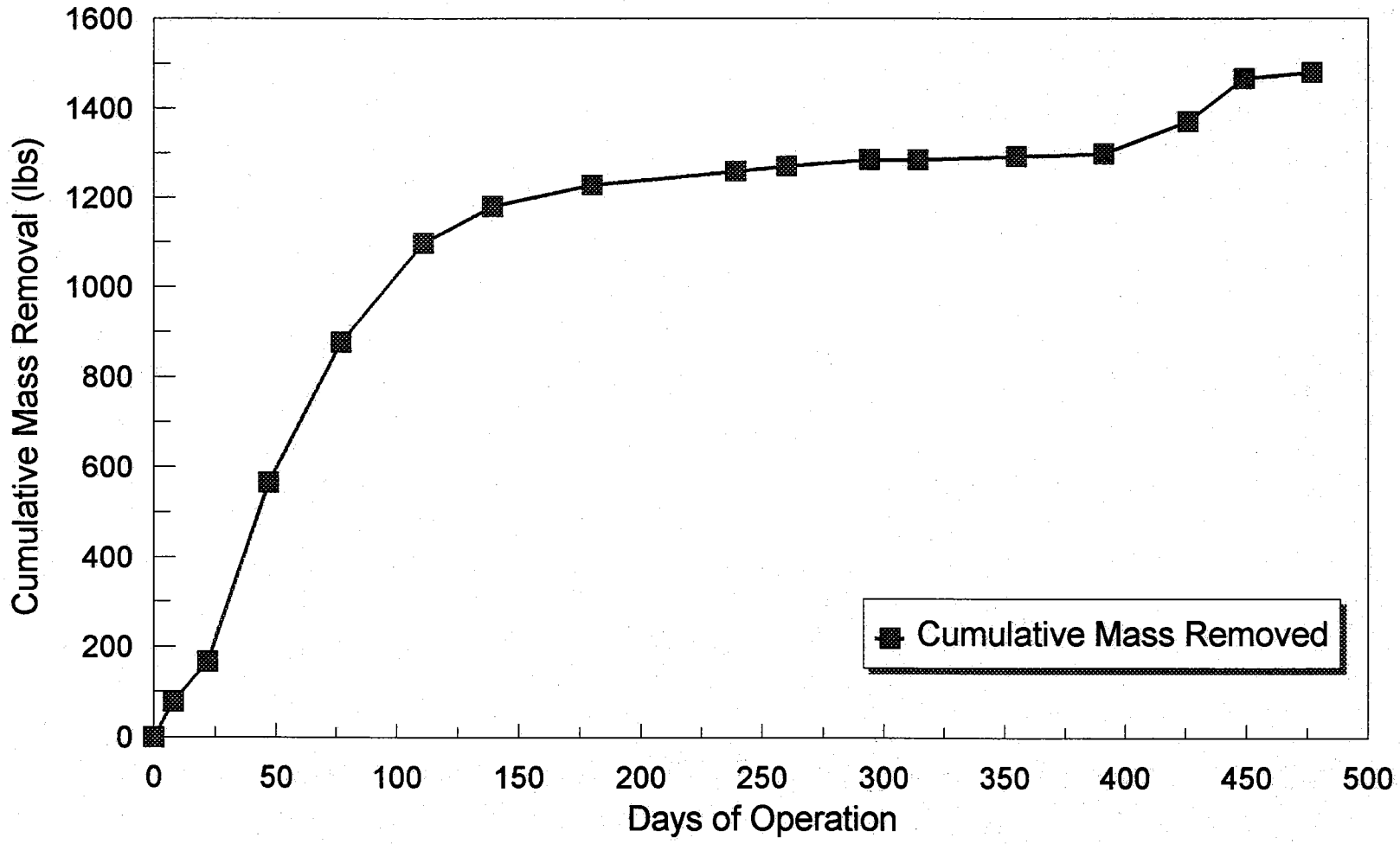
NEX Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

Figure 6 - Cumulative Mass Removed versus Time

NEX Site, New London Naval Submarine Base, Groton, CT



MASSREM.WK4

ATTACHMENT 1

SITE VISIT FORMS

OPERATIONAL DATA FORM
Air Sparging/Soil Vapor Extraction System
Dolphin Mart
Naval Submarine Base -Groton, CT
Project #83001-9999

Date: 11/20/97
Time: 17:00
Technician: J.K.JR.

AIR COMPRESSOR SYSTEM

Flow Rate 983608 SCFM 32 (use anemometer in hole in pipe near Hersey flowmeter) 3006

Air Compressor C-1			Air Compressor C-2		
Pressure	6.5	psi	Pressure	NA	psi
Temperature	192	°F	Temperature		°F
Flow Control Valve Setting	100%		Flow Control Valve Setting		
Bleed Valve	50%		Bleed Valve		
Radiator	ON / OFF		Radiator	ON / OFF	

SOIL VAPOR EXTRACTION SYSTEM

Vacuum Pump V-1			Vacuum Pump V-2		
Vacuum	5.25	"Hg	Vacuum	6.25	"Hg
Temperature	124	°F	Temperature	125	°F
Particulate Filter	OK		Particulate Filter	OK	
Flow Control Valve Setting	100%		Flow Control Valve Setting	100%	
Bleed Air Valve Setting	25%		Bleed Air Valve Setting	25%	
Liquid Level	0		Liquid Level	0	

Vacuum Pump V-3			Vacuum Pump V-4		
Vacuum	NA	"Hg	Vacuum	NA	"Hg
Temperature		°F	Temperature		°F
Particulate Filter			Particulate Filter		
Flow Control Valve Setting			Flow Control Valve Setting		
Bleed Air Valve Setting			Bleed Air Valve Setting		
Liquid Level			Liquid Level		

ACTIVATED CARBON ADSORPTION SYSTEM

Carbon Adsorber A/B			Carbon Adsorber C/D		
Pressure	NA	psi	Pressure		psi
Inf. VOC Level		ppm	Inf. VOC Level	18	ppm
Mid. VOC Level		ppm	Mid. VOC Level	12	ppm
Eff. VOC Level		ppm	Eff. VOC Level	17	ppm
Change out Date			Change out Date	8/22/96	

WATER TREATMENT

Flowmeter Reading 3025.5 Gallons (prior to discharge) Flowmeter Reading 3071.8 Gallons (after discharge)

COMMENTS

* FILL IN ALL SPACES WITH THE APPROPRIATE READING OR "NA".

OPERATIONAL DATA FORM
Air Sparging/Soil Vapor Extraction System
Naval Exchange
Naval Submarine Base -Groton, CT
Project #83001-9999

Date: 11/20/97
Time: 16:00
Technician: J.K. Jr.

AIR COMPRESSOR SYSTEM

Eastern Flow Rate	206-220	SCFM	Total Flow	60412330	SCFM
Western Flow Rate	0	SCFM	Total Flow	12819813	SCFM

Air Compressor C-1			Air Compressor C-2		
Pressure	NA	psi	Pressure	NA	psi
Temperature		°F	Temperature		°F
Flow Control Valve Setting			Flow Control Valve Setting		
Bleed Valve			Bleed Valve		
Radiator	ON / OFF		Radiator	ON / OFF	

SOIL VAPOR EXTRACTION SYSTEM

Vacuum Pump V-1			Vacuum Pump V-2		
Vacuum	NA	"Hg	Vacuum	3.5	"Hg
Temperature		°F	Temperature	122	°F
Particulate Filter			Particulate Filter	OK	
Flow Control Valve Setting			Flow Control Valve Setting	100 %	
Bleed Air Valve Setting			Bleed Air Valve Setting	25	
Liquid Level			Liquid Level	OK	

Vacuum Pump V-3			Vacuum Pump V-4		
Vacuum	NA	"Hg	Vacuum	NA	"Hg
Temperature		°F	Temperature		°F
Particulate Filter			Particulate Filter		
Flow Control Valve Setting			Flow Control Valve Setting		
Bleed Air Valve Setting			Bleed Air Valve Setting		
Liquid Level			Liquid Level		

ACTIVATED CARBON ADSORPTION SYSTEM

Carbon Adsorber A/B			Carbon Adsorber C/D		
Pressure	NA	psi	Pressure	10	psi
Inf. VOC Level		ppm	Inf. VOC Level	122	ppm
Mid. VOC Level		ppm	Mid. VOC Level	63	ppm
Eff. VOC Level		ppm	Eff. VOC Level	58	ppm
Change out Date			Change out Date	8/22/96	

WATER TREATMENT

Flowmeter Reading 4777.2 Gallons (prior to discharge) Flowmeter Reading _____ Gallons (after discharge)

COMMENTS

* FILL IN ALL SPACES WITH THE APPROPRIATE READING OR "NA".

Flow Rate C-1 Total Flow C1 SCFM
21 58 00 0

NAVAL SUBMARINE BASE GROTON, CT. (NEX SITE)

OPERATIONAL DATA FORM
OT-8\MW-7 PRODUCT RECOVERY SYSTEM
Naval Submarine Base, Groton, Ct.
Project # 87260014
Task #140

Date: 11-20-97
Time: 16:25
Technician: J Kowzun Jr

Check compressor, pressure should be 80 psi. ✓
Check air dryer panel, pressure should be 60 psi. ✓
Drain moisture trap on panel dryer.
Gauge recovery tank: Total depth: 2.77
DTW:
DTP: 2.69

	DTW	DTP	DTB
Comments: MW 7	4.74	4.73	9.60

OPERATIONAL DATA FORM
Air Sparging/Soil Vapor Extraction System
Dolphin Mart
Naval Submarine Base -Groton, CT
Project #83001-9999

Date: 11/11/97
Time: 10:20
Technician: J.K.JR.

AIR COMPRESSOR SYSTEM

Flow Rate 637826 ~~Spm (SCFM)~~ [redacted]

Air Compressor C-1			Air Compressor C-2		
Pressure	8.75	psi	Pressure	NA	psi
Temperature	202	°F	Temperature		°F
Flow Control Valve Setting	100 %		Flow Control Valve Setting		
Bleed Valve	50 %		Bleed Valve		
Radiator	ON / OFF		Radiator	ON / OFF	

SOIL VAPOR EXTRACTION SYSTEM

Flow Rate 3000 ~~SPM SCFM~~ Total Flow SCFM

Vacuum Pump V-1			Vacuum Pump V-2		
Vacuum	2	"Hg	Vacuum	4.25	"Hg
Temperature	132 ~~25 %~~	°F	Temperature	133	°F
Particulate Filter	OK		Particulate Filter	OK	
Flow Control Valve Setting	100 %		Flow Control Valve Setting	100 %	
Bleed Air Valve Setting	25 %		Bleed Air Valve Setting	25 %	
Liquid Level	OK		Liquid Level	OK	

Vacuum Pump V-3			Vacuum Pump V-4		
Vacuum	NA	"Hg	Vacuum	NA	"Hg
Temperature		°F	Temperature		°F
Particulate Filter			Particulate Filter		
Flow Control Valve Setting			Flow Control Valve Setting		
Bleed Air Valve Setting			Bleed Air Valve Setting		
Liquid Level			Liquid Level		

ACTIVATED CARBON ADSORPTION SYSTEM

Carbon Adsorber A/B			Carbon Adsorber C/D		
Inf. VOC Level		ppm	Inf. VOC Level		ppm
Inf Pressure		psi	Inf Pressure		psi
Mid. VOC Level		ppm	Mid. VOC Level		ppm
Mid Pressure		psi	Mid Pressure		psi
Eff. VOC Level		ppm	Eff. VOC Level		ppm
Change out Date			Change out Date		

WATER TREATMENT

Flowmeter Reading 3035.5 Gallons (before discharge) NA gal (after discharge)

COMMENTS

Complete all spaces with the appropriate reading or "NA"

OPERATIONAL DATA FORM
Air Sparging/Soil Vapor Extraction System
Naval Exchange
Naval Submarine Base -Groton, CT
Project #83001-9999

Date: 11/11/97
Time: 10:50
Technician: J.K. Jr.

AIR COMPRESSOR SYSTEM

Flow Rate 218797 SCFM | Total Flow 0 SCFM

Air Compressor C-1
Pressure NA psi
Temperature °F
Flow Control Valve Setting
Bleed Valve
Radiator ON / OFF

Air Compressor C-2
Pressure NA psi
Temperature °F
Flow Control Valve Setting
Bleed Valve
Radiator ON / OFF

SOIL VAPOR EXTRACTION SYSTEM

Eastern Flow Rate 60119050 SCFM | Total Flow 87-105 SCFM

Western Flow Rate 12819676 SCFM | Total Flow 0 SCFM

Vacuum Pump V-1
Vacuum NA °Hg
Temperature °F
Particulate Filter
Flow Control Valve Setting
Bleed Air Valve Setting
Liquid Level

Vacuum Pump V-2
Vacuum 1 °Hg
Temperature 114 °F
Particulate Filter OK
Flow Control Valve Setting 100%
Bleed Air Valve Setting 25%
Liquid Level OK

Vacuum Pump V-3
Vacuum NA °Hg
Temperature °F
Particulate Filter
Flow Control Valve Setting
Bleed Air Valve Setting
Liquid Level

Vacuum Pump V-4
Vacuum NA °Hg
Temperature °F
Particulate Filter
Flow Control Valve Setting
Bleed Air Valve Setting
Liquid Level

ACTIVATED CARBON ADSORPTION SYSTEM

Carbon Adsorber A/B
Inf. VOC Level ppm
Inf Pressure psi
Mid. VOC Level ppm
Mid Pressure psi
Eff. VOC Level ppm
Change out Date

Carbon Adsorber C/D
Inf. VOC Level ppm
Inf Pressure psi
Mid. VOC Level ppm
Mid Pressure psi
Eff. VOC Level ppm
Change out Date

WATER TREATMENT

Flowmeter Reading 4777.2 Gallons (before discharge) NA gal (after discharge)

COMMENTS

Complete all spaces with the appropriate reading or "NA"

ATTACHMENT 2

MONTHLY FIELD ACTIVITY SUMMARY

Field Activity Summary

November 1997

New London Naval Submarine Base
Groton, Connecticut

Week Ending	Site	Period	Field Activities	Comments
11/14/97	Dolphin Mart	Monthly Monitoring	Conducted flyby system check.	High pressure alarm caused air sparge compressor to shut down. High water level in moisture separator caused SVE blower V-2 to shut down.
	NEX		Conducted flyby system check.	High water level in moisture separator caused one SVE blower (V-4) and air sparge compressor to shut down.
11/21/97	Dolphin Mart	Monthly Monitoring	Conducted monthly system monitoring, DMR sampling, effluent off-gas sampling, and quarterly groundwater sampling.	High pressure alarm caused air sparge compressor to shut down. High water level in moisture separator caused SVE blower V-2 to shut down.
	NEX		Conducted monthly system monitoring, effluent off-gas sampling, and quarterly groundwater sampling.	High water level in moisture separator caused one SVE blower (V-2) and air sparge compressor to shut down.
	OT-8		Conducted monthly system monitoring	Product recovery system operating normally.

ATTACHMENT 3

AIR SPARGE/SVE SYSTEM DATABASES

SYSTEM MONITORING DATA
SOIL VAPOR EXTRACTION/AIR SPARGE SYSTEM

New London Naval Submarine Base
Dolphin Mart Site
Groton, CT

Date	Air Sparge Flowrate (scfm)	Extraction Flowrate (scfm)	Influent Concentration BTEX (ppmv)	Removal Rate BTEX (lb/hr)	Influent Concentration MTBE (ppmv)	Removal Rate MTBE (lb/hr)	Influent Concentration Aliphatics (ppmv)	Removal Rate Aliphatics (lb/hr)	Influent Concentration Aromatics (ppmv)	Removal Rate Aromatics (lb/hr)	Influent Concentratio TVPH (mg/m3)	Influent Concentration TVPH (ppmv)	Removal Rate TVPH (lb/hr)	Total Mass Removal Rate (lbs/hr)	Period Mass Removed (lbs)	Cumulative Mass Removed (lbs)	Comments
07/02/96	25	450	24.00	0.187	33.00	0.232	1000.00	6.876	0.00	0.000	—	—	0.000	7.295	0.00	0.00	
07/23/96	20	449	11.40	0.091	0.00	0.000	200.00	1.375	0.00	0.000	—	—	0.000	1.467	446.86	446.86	system operated approx. 102 hrs between 7/2 and 7/23
08/08/96	32	454	18.00	0.142	—	0.000	210.00	1.444	12.00	0.102	—	—	0.000	1.687	209.75	656.61	system operated approx. 133 hrs between 7/23 and 8/8
08/30/96	0	450	18.00	0.142	—	0.000	210.00	1.444	12.00	0.102	—	—	0.000	1.687	187.31	843.92	system operated approx. 111 hrs between 8/8 and 8/30
10/02/96	30	448	2.30	0.019	0.00	0.000	—	0.000	—	0.000	NA	36.00	0.287	0.306	0.00	843.92	system not in operation from 8/30 to 10/2 due to flow meter problem
10/16/96	30	450	2.30	0.019	0.00	0.000	—	0.000	—	0.000	NA	36.00	0.287	0.306	102.81	946.74	system reactivated 10/2/96
11/19/96	30	450	0.38	0.003	0.00	0.000	—	0.000	—	0.000	22.00	5.29	0.042	0.045	143.33	1090.06	
12/17/96	30	450	0.12	0.001	0.00	0.000	—	0.000	—	0.000	8.20	1.97	0.016	0.017	20.84	1110.90	
01/27/97	30	450	1.35	0.011	0.00	0.000	—	0.000	—	0.000	55.00	13.23	0.106	0.117	65.56	1176.46	
03/27/97	30	450	0.00	0.000	0.00	0.000	—	0.000	—	0.000	0.00	3.90	0.031	0.031	104.53	1228.73	assume 50% up-time, blowers shutting down due to influent water
04/17/97	30	450	0.00	0.000	0.00	0.000	—	0.000	—	0.000	13.00	3.13	0.025	0.025	14.13	1242.86	
05/21/97	15	329	0.00	0.000	0.00	0.000	—	0.000	—	0.000	24.00	5.77	0.034	0.034	11.96	1254.82	assume 50% up-time, blowers shutting down due to influent water
06/10/97	15	329	0.25	0.002	0.00	0.000	—	0.000	—	0.000	47.00	11.31	0.066	0.067	12.14	1266.96	assume 50% up-time, blowers shutting down due to influent water
07/21/97	15	329	1.89	0.011	0.00	0.000	—	0.000	—	0.000	340.00	81.79	0.477	0.488	136.76	1403.71	assume 50% up-time, blowers shutting down due to influent water
08/26/97	15	482	0.73	0.007	0.00	0.000	—	0.000	—	0.000	45.00	10.82	0.092	0.099	126.91	1530.63	assume 50% up-time, blowers shutting down due to influent water
09/30/97	15	482	0.34	0.003	0.00	0.000	—	0.000	—	0.000	88.00	21.17	0.181	0.184	17.84	1548.46	assume ~15% up-time, blowers shutting down due to influent water
10/23/97	14	589	0.00	0.000	0.00	0.000	—	0.000	—	0.000	100.00	24.06	0.251	0.251	120.10	1668.56	
11/20/97	32	590	0.00	0.000	5.45	0.050	—	0.000	—	0.000	160.00	38.49	0.403	0.453	118.28	1786.84	assume 50% up-time, blowers shutting down due to influent water

Notes:
1) Aliphatics are weighted using a response factor of hexane. (MW = 86.2)
2) Aromatics are weighted using a response factor of o-xylene. (MW=106.16)
3) Analytical data for 8/30/96 is assumed based on results of sampling conducted 8/8/96. System was deactivated 8/30/96 due to flow meter failure.
4) Flow rate of 10/16/96 through 4/17/97, 6/10/97 and 7/21/97 is assumed. Air flow meter not in operation.
5) Analytical data for 10/2 is assumed based on data from 10/16/96.
6) Beginning 10/16/96 lab analysis was performed by Mitkem Laboratory. Prior to 10/16/96 air analysis performed by NEI/GTEL
7) Mitkem results report total volatile petroleum hydrocarbons, not misc. aromatics and aliphatics.
Total Volatile Petroleum Hydrocarbons are weighted to molecular weight of 100.
8) Laboratory results from 11/19/96 to present are reported in mg/m3.

SYSTEM MONITORING DATA
SOIL VAPOR EXTRACTION/AIR SPARGE SYSTEM

New London Naval Submarine Base
NEX Site
Groton, CT

Date	Air Sparge Flowrate (scfm)	Extraction Flowrate (east side) (scfm)	Extraction Flowrate (west side) (scfm)	Extraction Flowrate (total) (scfm)	Extraction Flowrate (cfm)	Influent Concentration BTEX (ppmv)	Removal Rate BTEX (lb/hr)	Influent Concentration MTBE (ppmv)	Removal Rate MTBE (lb/hr)	Influent Concentration Aliphatics (ppmv)	Removal Rate Aliphatics (lb/hr)	Influent Concentration Aromatics (ppmv)	Removal Rate Aromatics (lb/hr)	Influent Concentration TVPH (mg/m3)	Influent Concentration TVPH (ppmv)	Removal Rate TVPH (lb/hr)	Total Mass Removal Rate (lbs/hr)	Period Mass Removed (lbs)	Cumulative Mass Removed (lbs)	Comments
07/31/96	NA*	54	199	253	288.00	1.80	0.013	—	0.000	130.00	0.810	0.00	0.000	—	—	0.000	0.823	0.00	0.00	
08/08/96	NA*	85	185	270	307.35	1.80	0.013	—	0.000	130.00	0.810	0.00	0.000	—	—	0.000	0.823	78.21	78.21	system operated approx. 92 hrs between 7/31 and 8/8
08/22/96	NA*	85	185	270	307.35	1.80	0.013	—	0.000	130.00	0.810	0.00	0.000	—	—	0.000	0.823	88.09	166.30	24-hour per day system operation began 8/8
09/16/96	NA*	186	134	320	364.27	2.70	0.021	0.00	0.000	—	0.000	—	0.000	—	61.00	0.487	0.508	399.38	565.68	
10/16/96	NA*	186	134	320	364.27	2.50	0.020	0.00	0.000	—	0.000	—	0.000	—	42.00	0.335	0.355	310.76	876.44	
11/19/96	NA*	192	132	324	368.83	0.95	0.008	0.00	0.000	—	0.000	—	0.000	94.00	22.61	0.180	0.188	221.67	1098.10	
12/17/96	NA*	223	87	310	352.89	0.18	0.001	0.07	0.000	—	0.000	—	0.000	29.00	6.98	0.056	0.058	82.54	1180.65	
01/27/97	NA*	252	69	321	365.41	0.14	0.001	0.00	0.000	—	0.000	—	0.000	20.00	4.81	0.038	0.040	47.78	1228.42	
03/27/97	NA**	267	117	384	437.13	0.00	0.000	0.00	0.000	—	0.000	—	0.000	—	0.55	0.004	0.004	31.10	1259.52	
04/17/97	NA**	460	261	721	820.75	0.00	0.000	0.00	0.000	—	0.000	—	0.000	12.00	2.89	0.037	0.037	10.40	1269.92	
05/21/97	6***	360	0	360	409.81	0.00	0.000	0.00	0.000	—	0.000	—	0.000	0.00	0.00	0.000	0.00	15.46	1285.39	
06/10/97	2***	300	0	300	341.51	0.00	0.000	0.00	0.000	—	0.000	—	0.000	0.00	0.00	0.000	0.00	0.48	1285.87	
07/21/97	36***	358	0	358	407.53	0.00	0.000	0.00	0.000	—	0.000	—	0.000	8.50	2.04	0.013	0.013	6.88	1292.74	
08/26/97	28***	223	0	223	253.28	0.00	0.000	0.00	0.000	—	0.000	—	0.000	0.00	0.00	0.000	0.00	6.04	1298.78	One blower down due to high water level in moisture trap.
09/30/97	27***	221	0	221	251.58	2.37	0.016	6.00	0.021	—	0.000	—	0.000	140.00	33.68	0.132	0.169	71.24	1370.01	One blower down due to high water level in moisture trap.
10/23/97	47***	322	0	322	366.55	2.47	0.016	17.05	0.086	—	0.000	—	0.000	395.00	95.02	0.542	0.644	96.55	1466.57	Two blowers down due to high water level in moisture trap.
11/20/97	47***	213	0	213	242.47	0.50	0.004	1.12	0.004	—	0.000	—	0.000	68.00	16.36	0.062	0.069	13.61	1480.17	One blower down due to high water level in moisture trap.

Notes:
* Air sparge compressor not activated due to elevated SVE influent concentrations.
** Air sparge compressor not activated due to improperly sized pressure switch.
*** Air sparge compressor activated, but high water levels in the moisture separators cause frequent compressor shut-down.
1) Aliphatics are weighted using a response factor of hexane. (MW = 86.2)
2) Aromatics are weighted using a response factor of o-xylene. (MW=106.16)
3) Analytical data for 7/31/96 is assumed based on results of sampling conducted 8/8/96.
4) Analytical data for 8/22/96 is assumed based on results of sampling conducted 8/8/96.
5) Air flow rate from 10/16/96 assumed for 9/16/96, due to a broken flow meter
6) Beginning 9/16/96 lab analysis was performed by Mitkem Laboratory. Prior to 9/16/96 air analysis performed by NEI/GTEL
7) Mitkem results report total volatile petroleum hydrocarbons, not misc. aromatics and aliphatics.
Total Volatile Petroleum Hydrocarbons are weighted to molecular weight of 100.

ATTACHMENT 4

HISTORICAL CARBON USAGE SUMMARY

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)[1]	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
2	7-2-96	17:05	66	8.1	452	25		Dolphin Mart Site
	7-3-96	8:50	375	289	448	33		
							15.75	
3	7-11-96	15:10	204.8	0	449	25		Dolphin Mart Site
	7-12-96	7:30	534	268	450	37		
							16.33	
4	7-12-96	9:55	588	15	450	30		Dolphin Mart Site. System deactivated 7/12/96 15:55 for weekend.
	7-15-96	18:10	366	0.0	449	16		
	7-16-96	9:30	149	77	442	24		
							21.33	
5	7-19-96	11:30	105	0	440	16		Approx. 1 hour test-only on 7/19/96.
	7-22-96	10:30	142	0	445	15		
	7-23-96	11:20	215	75	449	20		
							25.83	
6	7/24/96	9:45	96	0	450	16		Dolphin Mart Site. System down up to 8 hrs on 7/19/96 for electrical work.
	7/25/96	17:45	84.6	0	446	17		
	7/26/96	11:45	275	192	442	21		
							40	

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)[1]	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
7	8/1/96	6:20	83.9	0	447.7	20		Dolphin Mart Site. Carbon loading test shut down for weekend 8/2/96.
	8/2/96	15:30	68	0	451	33		
	8/5/96	16:00	102	0	456	29		
	8/6/96	17:45	77.8	5.2	450	33		
	8/7/96	20:00	100.3	12.0	452	22		
	8/8/98	9:15	122.6	74.2	453.5	32		
							48	
8	8/1/96	6:50	6.6	4.5	116	0		NEX Site. A/B Carbon Units. Carbon Units placed back in service on 10/23/97.
	8/2/96	15:00	33	7.2	68.5	0		
	8/5/96	15:45	0	0	166	0		
	8/6/96	17:10	3.1	4.0	137	0		
	8/7/96	17:00	2.0	3.3	158	0		
	8/8/96	9:45	2.3	3.5	135	0		
	8/12/96	14:00	65.4	47.6	262	0		
	10/9/97	15:55	30	36	337	46		
	10/23/97	14:00	360	200	322	47		
	11/20/97	16:00	122	58	213	47		
							NA	

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)[1]	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
9	8/1/96	6:50	44	8	116	0		NEX Site. C/D Carbon Units.
	8/2/96	15:00	46.5	9.1	68.5	0		
	8/5/96	15:45	100	15.8	166	0		
	8/6/96	17:10	60	24.0	137	0		
	8/7/96	17:00	50.6	34	158	0		
	8/8/96	9:45	54.4	44	135	0		
							189	
10	8/22/96	12:00	120	0.0	448	30		Dolphin Mart Site. C/D Carbon Units
	8/24/96	12:30	141	55	445	35		
							116	

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)[1]	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
11	8/22/96	16:00	29	0.0	232	0		NEX Site. C/D Carbon Units. Carbon Units placed back in service on 10/23/97.
	8/27/96	9:20	36	12	228	0		
	8/30/96	14:40	26	24	108	0		
	9/4/96	16:00	49	NA	330	0		
	9/10/96	10:30	52.6	52.6	243	0		
	9/16/96	14:00	35	35	320	0		
	9/27/96	13:00	42.7	42.7	60	0		
	10/2/96	10:00	17	17	84	0		
	10/8/96	12:00	33.7	33.7	413	0		
	10/10/96	12:50	22.3	22.3	282	0		
	10/16/96	13:30	23.8	23.8	259	0		
	10/21/96	14:40	14.6	14.6	281	0		
	10/25/96	15:05	49.9	49.9	173	0		
	10/28/96	12:30	65.0	65.0	350	0		
	11/8/96	17:15	26.3	26.3	342	0		
	11/19/96	14:40	8.7	8.7	324	0		
	12/2/96	10:30	160	160	299	0		
	12/17/96	NA	5.0	5.0	310	0		
	1/13/97	14:20	8.2	8.2	322	0		
	1/27/97	17:10	15.0	15.0	322	0		
	2/17/97	16:30	2.2	2.2	288	0		

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)[1]	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
11 con'd	2/19/97	17:30	0.0	0.0	NS	NS		
	3/27/97	15:15	4.0	4.0	NS	NS		
	4/17/97	14:00	9.8/6.5[2]	9.8/6.5	721	NS		
	5/1/97	15:35	0.0	0.0	318	11.5		
	5/21/95	NA	4.9/7.9[2]	4.9/7.9[2]	360	6		
	6/10/97	NA	20.1	20.1	300	2		
	7/21/97	NS	NS	NS	358	36		
	8/4/97	10:00	16.5/4.6[2]	16.5/4.6[2]	223	28		
	8/26/97	15:00	45.2	45.2	NS	NS		
	9/30/97	11:15	66.0	66.0	221	27		
	10/9/97	15:55	39	39	337	46		
	10/23/97	14:00	480	340	322	47		
	11/20/97	16:00	122	58	213	47		
							NA	

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)[1]	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
12	8/27/96	12:45	68	1.0	450	32		Dolphin Mart Site. C/D Carbon Units. Units still in service.
	10/2/96	12:50	47.5	13.7	458	30		
	10/8/96	13:10	27	6.5	467	28		
	10/16/96	13:00	18	5.4	NS	NS		
	10/25/96	16:00	23.1	27.5	NS	NS		
	10/28/96	11:30	27.3	13.3	NS	NS		
	11/8/96	11:10	10.3	5.6	NS	NS		
	11/19/96	14:10	2.5	0.0	NS	NS		
	12/2/96	14:15	4.0	9.0	NS	NS		
	12/17/96	NA	13.0	2.0	NS	NS		
	12/30/96	NA	12.0	12.0	NS	NS		
	1/13/97	13:50	5.0	5.0	NS	NS		
	1/27/97	15:00	12.0	8.0	NS	NS		
	2/13/97	NA	2.4	0.0	NS	15		
	2/19/97	13:45	2.6	1.1	NS	NS		
	3/27/97	10:40	20	1.8	NS	NS		
	4/17/97	NA	8.7	7.3	NS	NS		
	5/1/97	12:30	3.6	1.9	298	16		
	5/21/97	NA	287.2	60.8	329	15		
	6/10/97	NA	3.2	2.6	329	15		
	7/21/97	NA	NS	NS	329	15		
	8/4/97	11:30	42.8	46.0	NS	NS		

Carbon Breakthrough Matrix
Dolphin Mart and NEX Site

Groton Naval Submarine Base
Groton, CT

Carbon Breakthrough (#)[1]	Sample Date	Sample Time	Influent Conc. (ppmv, PID/FID)	Effluent Conc. (ppmv, PID/FID)	SVE System Flow Rate (scfm)	Air Sparge System Flow Rate (scfm)	Estimated Breakthrough Time (hours)	Comments
12 con'd	8/26/97	10:15	52.0	92.0	NS	NS		
	9/30/97	15:38	31	26	482	15		
	10/9/97	12:45	484	361	NS	NS		
	10/23/97	13:40	3.8	1.0	589	14		
	11/20/97	17:00	18	17	590	32		
							NA	

Notes:
1 The initial carbon breakthrough (not included in this table) occurred during OHM's start-up activities.
2 AB/CD carbon units.
ppmv = parts per million by volume
PID = photoionization detector
FID = flame ionization detector
PGC = portable gas chromatograph
NS = not sampled

ATTACHMENT 5

HISTORICAL WELL GAUGING DATA

Well Gauging Data
Dolphin Mart Site
Groton Naval Submarine Base
Groton, Connecticut

Date	Depth to Water (ft) Well ID																			
	DM-1	DM-2	DM-3	DM-4	DM-5	HRP-10	HRP-11	MW-1	MW-2	MW-3	OBG8A	OBG9A	WE-1	WE-1A	WE-2D	WE-2S	WE-3	WE-4	WE-5	WE-6
07/02/96	6.37	NG	NG	NG	NG	4.65	NG	4.65	3.55	3.12	NG	0.82	DRY	DRY	6.56	6.78	8.67	4.24	4.80	3.40
07/03/96	NG	NG	NG	NG	NG	5.19	NG	4.63	2.86	0.00	NG	0.89	NG	NG	6.35	6.58	8.69	6.38	4.33	2.30
07/12/96	NG	NG	NG	NG	NG	5.81	NG	5.01	3.82	1.95	NG	1.85	NG	NG	6.83	6.96	8.93	6.38	4.98	3.60
07/16/96	NG	NG	NG	NG	NG	4.33	NG	4.55	2.89	0.74	NG	0.69	NG	NG	6.24	6.47	8.50	6.27	4.08	2.76
07/17/96	NG	NG	NG	NG	NG	2.73	NG	4.94	1.63	2.79	NG	0.00	NG	NG	5.88	6.30	8.62	6.47	3.62	1.72
07/19/96	NG	NG	NG	NG	NG	4.38	NG	5.21	0.61	0.00	NG	0.00	NG	NG	5.53	6.18	8.45	NG	3.19	1.08
07/22/96	NG	NG	NG	NG	NG	4.54	NG	4.82	1.95	1.17	NG	0.00	NG	NG	6.42	6.45	8.64	3.68	3.73	1.96
07/23/96	NG	NG	NG	NG	NG	4.55	NG	4.75	3.33	0.00	NG	0.20	NG	NG	6.33	6.70	8.72	8.72	4.49	2.40
07/24/96	NG	NG	NG	NG	NG	4.33	NG	5.22	1.18	0.00	NG	0.00	NG	NG	5.67	6.31	8.45	3.38	3.33	1.49
07/25/96	NG	NG	NG	NG	NG	4.46	NG	5.31	NG	NG	NG	0.16	NG	NG	NG	NG	NG	NG	NG	2.12
07/26/96	NG	NG	NG	NG	NG	4.43	NG	4.79	NG	NG	NG	0.00	NG	NG	NG	NG	NG	NG	NG	2.95
08/01/96	NG	NG	NG	NG	NG	3.93	NG	4.96	2.20	1.28	NG	NG	NG	NG	6.09	6.39	8.55	3.22	4.06	1.15
08/02/96	NG	NG	NG	NG	NG	4.08	NG	5.24	1.82	1.31	NG	0.00	NG	NG	5.73	6.30	8.56	2.96	3.76	0.86
08/05/96	NG	NG	NG	NG	NG	4.35	NG	5.08	NG	1.08	NG	0.00	NG	NG	NG	NG	NG	NG	NG	1.28
09/04/96	NG	NG	NG	NG	NG	5.43	NG	6.07	4.59	DRY	NG	NG	NG	NG	7.51	7.39	9.73	5.11	6.23	4.59
10/02/96	NG	NG	NG	NG	NG	3.53	NG	5.43	NG	3.86	NG	NG	NG	NG	5.82	6.41	8.41	3.11	3.96	1.60
10/21/96	NG	NG	NG	NG	NG	3.98	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	2.43
11/19/96	1.90	NG	2.06	2.68	5.37	4.15	NG	3.85	3.00	DRY	NG	NG	NG	NG	5.89	6.46	8.32	3.53	3.87	2.90
12/17/96	2.53	NG	1.60	NG	3.67	NG	NG	3.85	2.17	NG	NG	NG	NG	NG	NG	6.10	7.92	2.17	2.96	2.10
01/27/97	1.91	NG	1.89	NG	4.26	3.29	NG	2.53	2.13	NG	NG	NG	NG	NG	5.73	6.24	7.94	3.08	3.26	1.53
02/18/97	1.93	NG	1.90	2.04	NG	4.04	NG	2.98	2.56	2.28	NG	NG	NG	NG	5.84	6.32	7.95	3.49	3.21	2.55
03/27/97	1.89	2.27	1.86	2.41	4.60	4.04	3.21	2.91	1.86	1.27	NG	NG	5.03	DRY	5.45	6.21	8.08	1.66	3.51	1.15
04/17/97	NG	NG	NG	NG	NG	5.25	NG	3.48	1.94	1.39	NG	NG	NG	NG	NG	NG	NG	3.00	3.18	1.30
05/21/97	2.04	2.39	2.08	3.08	5.19	4.11	3.43	3.14	2.93	2.44	NG	NG	DRY	DRY	6.11	NG	8.20	3.73	4.07	2.84
08/27/97	NG	NG	NG	NG	NG	5.01	4.10	3.60	4.28	DRY	NG	2.46	NG	NG	7.03	NG	9.54	4.69	5.77	4.07
11/21/97	2.26	3.20	2.56	3.33	6.83	4.43	3.77	5.33	3.84	3.06	2.26	0.95	DRY	DRY	6.66	6.97	8.86	7.53	5.29	3.56

Note: WE-2D, WE-2S, and WE-3 are covered by stand pipes.

NG = Not Gauged

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W[illegible]g Data
[illegible]site
New London Naval Submarine Base
Groton, Connecticut

Date	Depth to Water/Depth to Product (ft) Well ID																								
	ERM-5	ERM-6	ERM-7	ERM-8	ERM-9	ERM-10	ERM-11	ERM-12	ERM-13	ERM-14	ERM-15	ERM-16	ERM-17	ERM-18	ERM-19	NEX-1	OBG-1	OBG-2	OBG-4	OBG-6	OBG-7	OBG-8	OBG-9	MW-4	MW-6
09/16/96	3.82	5.14	5.27	NG	NG	NG	NG	8.38	7.01	6.89	4.30	8.51	5.62	3.65	5.28	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
10/16/96	NG	4.82	4.75	NG	NG	NG	6.4	8.13	7.15	6.92	3.94	8.49	5.56	3.96	5.17	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
11/18/96	3.72	4.64	4.93	NG	NG	NG	6.36	8.09	7.13	7.10/6.91	4.03	8.43	5.53	NG	5.19	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
12/16/96	3.10	4.08	4.21	NG	NG	NG	5.02	7.83	6.55	6.35	NG	7.8	3.73	NG	4.23	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
02/17/97	3.00	4.34	4.29	NG	NG	NG	4.89	7.65	6.03	5.89	NG	7.85	4.53	NG	4.18	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
03/27/97	2.89	4.28	4.19	NG	NG	NG	5.19	7.63	5.98	5.82	NG	7.79	4.87	NG	4.06	5.81	8.12	7.95	7.75	7.95	5.61	NG	5.54	4.91	4.49
04/15/97	NG	NG	NG	NG	NG	NG	NG	NG	5.86	5.7	3.39	7.84	4.84	NG	NG	5.74	NG	7.92	7.75	NG	NG	NG	5.54	NG	NG
04/17/97	2.73	NG	NG	NG	NG	NG	NG	NG	NG	5.66	3.31	NG	4.67	NG	3.91	NG	NG	7.91	7.78	NG	NG	NG	5.58	NG	NG
04/24/97	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	7.74	NG	NG	NG	NG	NG	NG
05/21/97	NG	4.72	4.61	NG	NG	NG	6.27	7.81/7.80	6.15	6.04/5.99	NG	8.16	5.26	NG	4.46	5.80	7.98	7.81	7.64	NG	5.79	5.60	5.84/5.31	NG	4.85
08/28/97	NG	5.29	6.49	NG	NG	NG	7.65	NG	7.24	7.24/7.01	NG	sheen/8.63	5.77	NG	5.41	6.15	8.22	8.03	7.9	NG	6.49	NG	6.56/6.45	NG	5.34
11/20/97	4.35	5.24	5.35	NG	NG	NG	6.89	8.23	7.84	7.63	4.46	8.77	5.77	NG	5.79	6.45	8.43	8.23	8.07	NG	7.09	NG	7.06	NG	5.33

Notes:

NG = Not Gauged

Grsubbas\123\Gr190a.wk4

MW-7 Well Gauging Data
OT-8 Site
New London Naval Submarine Base
Groton, Connecticut

Date	Depth to Product (feet)	Depth to Water (feet)	LNAPL Thickness (feet)	LNAPL Recovered (gallons)	Cumulative LNAPL Recovered (gallons)
09/26/96	4.26	6.02	1.76	0.00	0.00
10/02/96	NS	NS	0.00	4.00	4.00
10/08/96	NS	NS	0.00	0.00	4.00
10/16/96	NS	NS	0.00	0.00	4.00
10/21/96	1.65	1.66	0.01	0.00	4.00
10/25/96	3.06	3.18	0.12	0.00	4.00
10/28/96	3.46	3.55	0.09	0.00	4.00
12/17/96	NA	0.00	0.00	0.00	4.00
01/13/97	7.76	7.86	0.10	0.00	4.00
01/27/97	NA	0.00	0.00	0.00	4.00
02/19/97	2.96	2.97	0.01	0.00	4.00
03/27/97	3.30	3.99	0.69	UNK*	4.00
04/17/97	3.12	3.34	0.22	0.00	4.00
05/21/97	4.09	5.07	0.98	0.25	4.25
06/10/97	sheen	4.64	sheen	0.00	4.25
07/21/97	5.43	5.55	0.12	0.00	4.25
08/04/97	5.62	5.73	0.11	0.00	4.25
08/26/97	5.28	5.31	0.03	0.00	4.25
10/09/97	6.14	6.75	0.61	0.00	4.25
10/23/97	6.38	6.75	0.37	0.00	4.25
11/20/97	4.73	4.74	0.01	0.00	4.25

Notes: Gauging on 10/02/96 and 10/16/96 was with a clear bailer, to visually confirm product thickness.
The well and vault were flooded on 12/17/96
NA = Not Applicable
NG = Not Gauged
* Product was recovered, but the volume was insufficient to fill the product piping and discharge into the recovery drum.

ATTACHMENT 6

HISTORICAL GROUNDWATER SAMPLING RESULTS

Table 1
Historical Groundwater Sampling Results
Dolphin Mart - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediaiton Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
DM-1	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	4.0	<473	NS	NS	NS
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	5	1,000	<500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS
DM-2	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	4.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	<1.0	<1.0	<1.0	<1.0	8	<500	8	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
B = Analyte detected in method blank, **D** = Analyte concentration was obtained from a diluted analysis, **E** = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, **GRO**=Gasoline Range Organics

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(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediaiton Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
DM-3	3/95	<1.0	<1.0	<1.0	<1.0	7.90	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	7	<500	<500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS
DM-4	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	5	600	<500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	**2**	<1.0	<1.0	<1.0	3	<500	5	NS	NS

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Dolphin Mart - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediaiton Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
DM-5	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	6	<500	<500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS
HRP-10	3/95	**304**	35.2	257	**1140**	<50	**6,080**	NS	NS	NS
	5/96	**125**	21	54	329	<20	**1,740**	NS	NS	NS
	11/96	**9**	<1.0	65	<1.0	7	<1,000	81	600	<500
	2/97	<1.0	<1.0	<1.0	<1.0	3	<500	3	<500	<500
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	3.0	**800**	3.0	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS

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Bold numbers indicate an exceedance of State of CT Clean-up Standards
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Dolphin Mart - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
HRP-11	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	1.0	<1.0	<1.0	3.0	<2.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS
MW-1	11/96	**3**	<1.0	5	<1.0	<1.0	<1,000	11	1,000	<500
	2/97	<1.0	<1.0	4	<1.0	<1.0	<500	4	<500	600
	5/97	<1.0	<1.0	4	<1.0	<1.0	<500	6	700	760
	8/97	<1.0	<1.0	16	2B	<1.0	**1,000**	18	800	600
	11/97	**2**	<1.0	9	<1.0	<1.0	<500	11	NS	NS

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DRO=Diesel Range Organics, GRO=Gasoline Range Organics

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Historical Groundwater Sampling Results
Dolphin Mart - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
MW-2	11/96	**4**	<1.0	14	<1.0	4	<1,000	28	1,200	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	**1,000**	1 B	1,200	1,200
	5/97	<1.0	<1.0	3	<1.0	<1.0	<500	3	500	580
	8/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	11/97	**2**	<1.0	3	1	3	<500	9	NS	NS
MW-3	2/97	**36**	23	72	500	5	**2,000**	645 B	3,300	1,600
	5/97	**60**	38	69	**730D**	<1.0	**5,000**	897D	7,900	<500
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	<1.0	2	3	56	<1.0	<500	61	NS	NS

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Dolphin Mart - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediaiton Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
OBG-8A	3/95	**72**	24.6	25.9	62.4	9.29	<473	NS	NS	NS
	5/96	**12.0**	<1.0	9.0	4.0	<2.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	**3**	25	5	5	<1.0	<500	38	NS	NS
OBG-9A	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	**3,000**	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	3.0	**11,000**	3.0	2,200	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS

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Bold numbers indicate an exceedance of State of CT Clean-up Standards
B = Analyte detected in method blank, D = Analyte concentration was obtained from a diluted analysis, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

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Dolphin Mart - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
WE-2D(B)	11/96	1	<1.0	<1.0	<1.0	<1.0	<1,000	3	<500	<500
	2/97	**2**	<1.0	<1.0	<1.0	3	<500	5	<500	<500
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	4.0	**11,000**	4.0	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS
WE-2S	3/95	**37.9**	24.2	60.3	126.4	21.3	**725**	NS	NS	NS
	5/96	**50**	22	101	144	<10	**1,570**	NS	NS	NS
	11/96	**7**	<1.0	9	4	14	<1,000	34	<500	<500
	2/97	**5**	<1.0	14	3	10	<500	32	500	600
	5/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
B = Analyte detected in method blank, **D** = Analyte concentration was obtained from a diluted analysis, **E** = Analyte concentration exceeded the calibration range
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(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediaiton Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
WE-3	3/95	<1.0	<1.0	<1.0	<1.0	8.70	<473	NS	NS	NS
	5/96	**2.0**	<1.0	<1.0	<1.0	14.0	<473	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	<1.0	<1.0	<1.0	<1.0	6	<500	6	<500	<500
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	**220**	**3,000**	220	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	38	<500	38	NS	NS
WE-4	3/95	**267**	29.8	392	**712**	<40	**5,180**	NS	NS	NS
	5/96	**160**	16	301	**617**	<40	**3,680**	NS	NS	NS
	11/96	**41**	1.0	100	2	19	<1,000	166	1,100	500
	2/97	**21**	<1	27	1	17	<500	66	500	700
	5/97	**13**	<1.0	13	<1.0	19	<500	45	700	540
	8/97	**7.0**	<1.0	19	3B	3B	**700**	44	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
B = Analyte detected in method blank, D = Analyte concentration was obtained from a diluted analysis, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics

Table 1
Historical Groundwater Sampling Results
Dolphin Mart - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO (by EPA Method 8100M)	GRO (by EPA Method 8015M)
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediaiton Standard		1.0	1,000	700	530	100	500	NA	NA	NA
Well	Date									
WE-5	11/96	**240D**	410D	**720D**	**4,300E**	27	**9,000**	5,697	12,000	8,900
	2/97	**42D**	10	89D	490D	6	**2,000**	637	2,000	1,200
	5/97	**370**	190	**840**	**3,900D**	<1.0	**4,000**	5,300	11,000	16,000
	8/97	**210D**	<1.0	210D	470DB	63D	**5,000**	953	3,900	2,500
	11/97	**11**	<1.0	2	6	27	**1,100**	46	NS	NS
WE-6	11/96	**5**	210D	71D	**630D**	<1.0	<1,000	916	2,000	1,400
	2/97	**3**	4	8	12	2	<500	29	800	700
	5/97	**3**	1.0	12	<1.0	<1.0	<500	15	1,200	1,200
	8/97	<1.0	1.0	<1.0	28	<1.0	**1,000**	29	<500	<500
	11/97	**2**	<1.0	3	2	4	<500	11	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
B = Analyte detected in method blank, **D** = Analyte concentration was obtained from a diluted analysis, **E** = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, **GRO**=Gasoline Range Organics

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Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		215	23,500	21,300	50,000	50,000	NA	NA	NA	NA
Well	Date									
ERM-5	3/95	**967**	431	390	1,340	<100	NS	3,295.1	430	8,250
	5/96	112	6	34	28	<10	NS	196	159	554
	11/96	**370D**	14	33	61D	<1.0	3,000	480	1,100	1,600
	2/97	**1,100**	1,100	580	1,600	<50	3,000	4,440 B	3,900	9,100
	5/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	**730**	250	870	620	<10	2,300	2,470	NS	NS
ERM-6	5/96	15	<1.0	<1.0	<1.0	<2.0	NS	35	63	<473
	11/96	**610**	230	770	2,400E	<40	5,000	4,054	500	7,800
	2/97	**430D**	21	300	1,000D	<10	2,000	1,763 B	2,200	4,800
	5/97	**430D**	21	640D	2,300D	<1.0	1,000	3,391D	1,500	6,700
	8/97	**470**	90	650	2,000	<1.0	2,000	3,210	3,500	6,200
	11/97	**250D**	23	260D	530D	<1.0	<500	1,063	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics
L P = Liquid-phase petroleum present; well could not be sampled

Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		215	23,500	21,300	50,000	50,000	NA	NA	NA	NA
Well	Date									
ERM-7	5/96	5	<1.0	<1.0	<1.0	<2.0	NS	8	38	<473
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	4	<500	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	1	<500	<500
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS
ERM-8 (destroyed)	3/95	109	11.5	272	157	<50	NS	665.4	464	2,350
	5/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics
L P = Liquid-phase petroleum present; well could not be sampled

Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		215	23,500	21,300	50,000	50,000	NA	NA	NA	NA
Well	Date									
ERM-9	5/96	<1.0	<1.0	<1.0	<1.0	2	NS	4	3,310	<473
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
ERM-11	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	3	<500	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	2	<500	<500
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, **B** = Analyte detected in method blank, **E** = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, **GRO**=Gasoline Range Organics
L P = Liquid-phase petroleum present; well could not be sampled

Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		215	23,500	21,300	50,000	50,000	NA	NA	NA	NA
Well	Date									
ERM-12	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	NS	1	27	<473
	5/96	1	2	7	14	<2.0	NS	61	4,300	1,390
	11/96	<1.0	2	<1.0	9	<1.0	3,000	16	7,300	6,700
	2/97	<1.0	1	2	9	<1.0	15,000	13	4,800	1,300
	5/97	LP	LP	LP	LP	LP	LP	LP	LP	LP
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	<1.0	<1.0	<1.0	4	<1.0	7,100	4	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics
L P = Liquid-phase petroleum present; well could not be sampled

Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		215	23,500	21,300	60,000	50,000	NA	NA	NA	NA
Well	Date									
ERM-13	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	NS	534	50	<473
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	NS	9	<100	<473
	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	2	<500	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics
L P = Liquid-phase petroleum present; well could not be sampled

Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		215	23,500	21,300	68,000	50,000	NA	NA	NA	NA
Well	Date									
ERM-14	3/95	292	4,880	8,190	6,020	<2.0	NS	19,995	4,840	3,670
	5/96	305	5,670	1,250	8,350	<2.0	NS	22,543	7,290	3,890
	11/96	270	8,300D	1,700D	11,000D	<25	7,000	21,270	12,000	30,000
	2/97	140	4,500D	980	7,100	<100	60,000	12,840	20,000	20,000
	5/97	LP	LP	LP	LP	LP	LP	LP	LP	LP
	8/97	LP	LP	LP	LP	LP	LP	LP	LP	LP
	11/97	40	2,300D	700D	2,500D	<1.0	4,600	5,540	NS	NS
ERM-15	11/96	280	760	330	1,100	<40	1,000	2,517	2,300	4,500
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	210	630	240	120	<10	<500	1,200	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics
L P = Liquid-phase petroleum present; well could not be sampled

Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		215	21,500	21,300	50,000	50,000	NA	NA	NA	NA
Well	Date									
ERM-16	11/96	37	<2.0	13	16	30	<1,000	68	4,400	2,000
	2/97	56D	<1.0	16	34	27	6,000	136	11,000	1,400
	5/97	34	<1.0	20	42	11	26,000	107	60,000	2,000
	8/97	LP	**LP**	**LP**	**LP**	**LP**	**LP**	**LP**	**LP**	**LP**
	11/97	5	<1.0	7	30	<1.0	15,000	42	NS	NS
ERM-17	11/96	10	<1.0	<1.0	<1.0	9	<1,000	11	600	600
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	1,000	<1.0	500	<500
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	1,500	<500
	8/97	12	<1.0	<1.0	<1.0	<1.0	1,000	12	1,000	500
	11/97	2	<1.0	<1.0	<1.0	<1.0	<500	2	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics
L P = Liquid-phase petroleum present; well could not be sampled

Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		215	23,500	21,300	50,000	50,000	NA	NA	NA	NA
Well	Date									
ERM-19	11/96	<1.0	<1.0	<1.0	<1.0	<1.0	<1,000	1	<500	<500
	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS
MW-4	2/97	29	1	<1.0	3	<1.0	NS	33	NS	NS
	5/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	2/97	<1.0	9	<1.0	<1.0	<1.0	NS	9	NS	NS
	5/97	18	<1.0	2	8.0	<1.0	<500	28	<500	<500
	8/97	35D	1.0	<1.0	8.0	<1.0	<500	46	<500	<500
	11/97	6	<1.0	<1.0	3	<1.0	<500	9	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics
L P = Liquid-phase petroleum present; well could not be sampled

Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		215	23,500	21,300	50,000	50,000	NA	NA	NA	NA
Well	Date									
NEX-1	3/95	<1.0	<1.0	<1.0	<1.0	<2.0	NS	7	35	<143
	5/96	<1.0	<1.0	<1.0	<1.0	<2.0	NS	8	<122	<143
	11/96	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	5/97	2	11	4	34	<1.0	<500	57	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	3.0	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS
OBG-1	5/97	**480**	3,300D	1,100D	10,000D	540	110,000	15,420	260,000	49,000
	8/97	**1,600**	6,200	1,700	12,000	810	220,000	**22,310**	580,000	56,000
	11/97	**1,600**	8,800	2,300	16,000	38,000	21,000	66,700	NS	NS
OBG-2	5/97	77	280	530	9,800D	290	87,000	10,977	120,000	44,000
	8/97	**470**	410	1,100	11,000	830	180,000	13,990	99,000	75,000
	11/97	**370**	380	960	9,200	40,000	23,000	50,910	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics
L P = Liquid-phase petroleum present; well could not be sampled

Table 2
Historical Groundwater Sampling Results
NEX - March 1995 - November 1997
Naval Submarine Base, Groton, CT

(analytical results in µg/l)

Compound		BTEX				MTBE	TPH (By EPA Method 418.1)	Total Volatiles (by EPA Method 8010/8020)	DRO	GRO
		Benzene	Toluene	Ethylbenzene	Xylenes					
Remediation Standard		216	23,500	21,300	50,000	50,000	NA	NA	NA	NA
Well	Date									
OBG-4	2/97	<1.0	<1.0	<1.0	<1.0	<1.0	NS	<1.0	NS	NS
	5/97	<1.0	<1.0	<1.0	2	<1.0	6,000	2	3,100	<500
	8/97	<1.0	<1.0	<1.0	<1.0	4.0	1,000	4.0	3,500	<500
	11/97	<1.0	3	<1.0	7	8	NS	18	NS	NS
OBG-7	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	11/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	NS	NS
OBG-8	5/97	<1.0	<1.0	<1.0	<1.0	<1.0	<500	<1.0	<500	<500
	8/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/97	NS	NS	NS	NS	NS	NS	NS	NS	NS
OBG-9	5/97	LP	LP	LP	LP	LP	LP	LP	LP	LP
	8/97	LP	LP	LP	LP	LP	LP	LP	LP	LP
	11/97	**490**	4,800	2,100	16,000	<200	24,000	23,390	NS	NS

Notes: NS = Not sampled (NS results have been shaded)
Bold numbers indicate an exceedance of State of CT Clean-up Standards
D = Analyte concentration was obtained from a diluted analysis, B = Analyte detected in method blank, E = Analyte concentration exceeded the calibration range
DRO=Diesel Range Organics, GRO=Gasoline Range Organics
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ATTACHMENT 7

MW-7 WELL CONSTRUCTION LOG

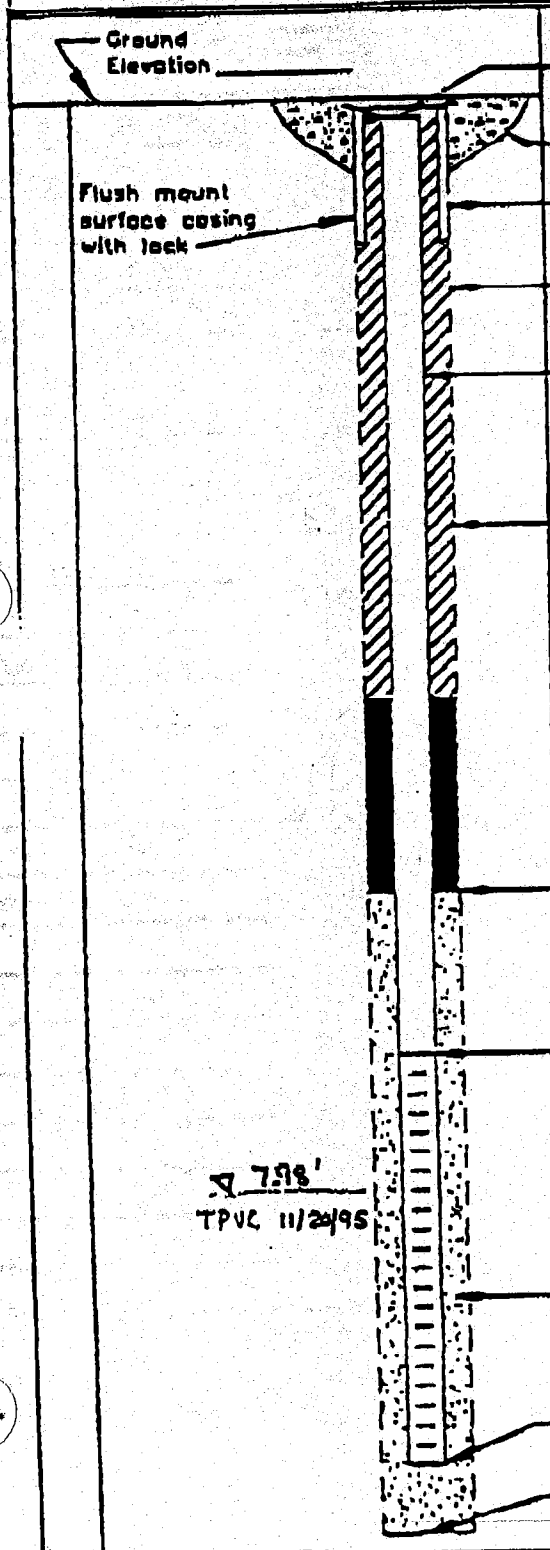
MONITORING WELL SHEET

TANK FARM WELLS

PROJECT NSB NLON
PROJECT NO. 4626
ELEVATION
FIELD GEOLOGIST CONTI

LOCATION GROTON, CT.
BORING HNUS-07
DATE 10-3-95

DRILLER SOILTEST, INC
DRILLING METHOD HSA
DEVELOPMENT METHOD PUMP



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL: CONCRETE

TYPE OF PROTECTIVE CASING: FLUSH MOUNT

I.D. OF PROTECTIVE CASING: 4"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2" ϕ

TYPE OF BACKFILL/SEAL: CEMENT GROUT

DEPTH/ELEVATION TOP OF SAND: 3'

DEPTH/ELEVATION TOP OF SCREEN: 5'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 10 SL X 10

TYPE OF SAND PACK: #20-30 SAND

DIAMETER OF HOLE IN BEDROCK: NA

DEPTH/ELEVATION BOTTOM OF SCREEN: 15'

DEPTH/ELEVATION BOTTOM OF SAND: 15'

DEPTH/ELEVATION BOTTOM OF HOLE: 15'

BACKFILL MATERIAL BELOW SAND: NA